EPA
United States
Environmental Protection
Agency

National Biodefense Strategy Calls for a Robust Decontamination Capability



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Office of Research and Development
Center for Environmental Solutions and Emergency Response

International Decon Conference
November 19, 20219

BUSINESS INSIDER

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CDC Says It Just Discovered Vials Identified As Smallpox At A Lab In Maryland

Kevin Loria Jul 8, 2014, 1:27 PM

On July 1, workers at the National Institutes of Health notified the Centers for Disease Control and Prevention that they discovered vials containing smallpox in a cold storage room of a Food and Drug Administration lab on the NIH Bethesda campus.

An Israeli nurse holds a vial of smallpox vaccine in 2002. People in the United States haven't received a vaccine for

Because it's so infectious

The Washington Post
Democracy Dies in Darkness

WorldViews

Two Ebola patients who fled quarantine may have exposed dozens to virus

npr WAMU 88.5 DONATE

oats and Soda

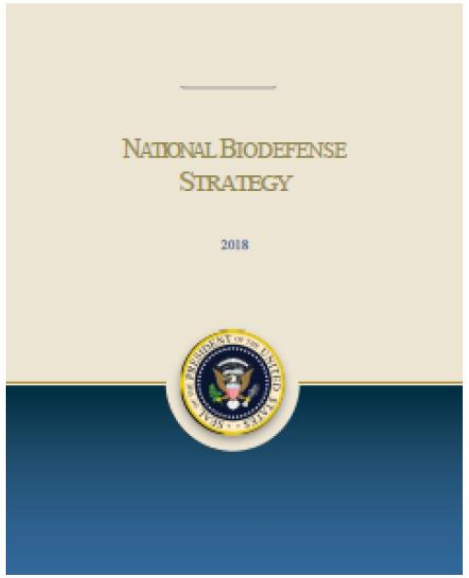
ussian Lab Explosion Raises Question: hould Smallpox Virus Be Kept Or estroyed?

ptember 19, 2019

RAN KRITZ

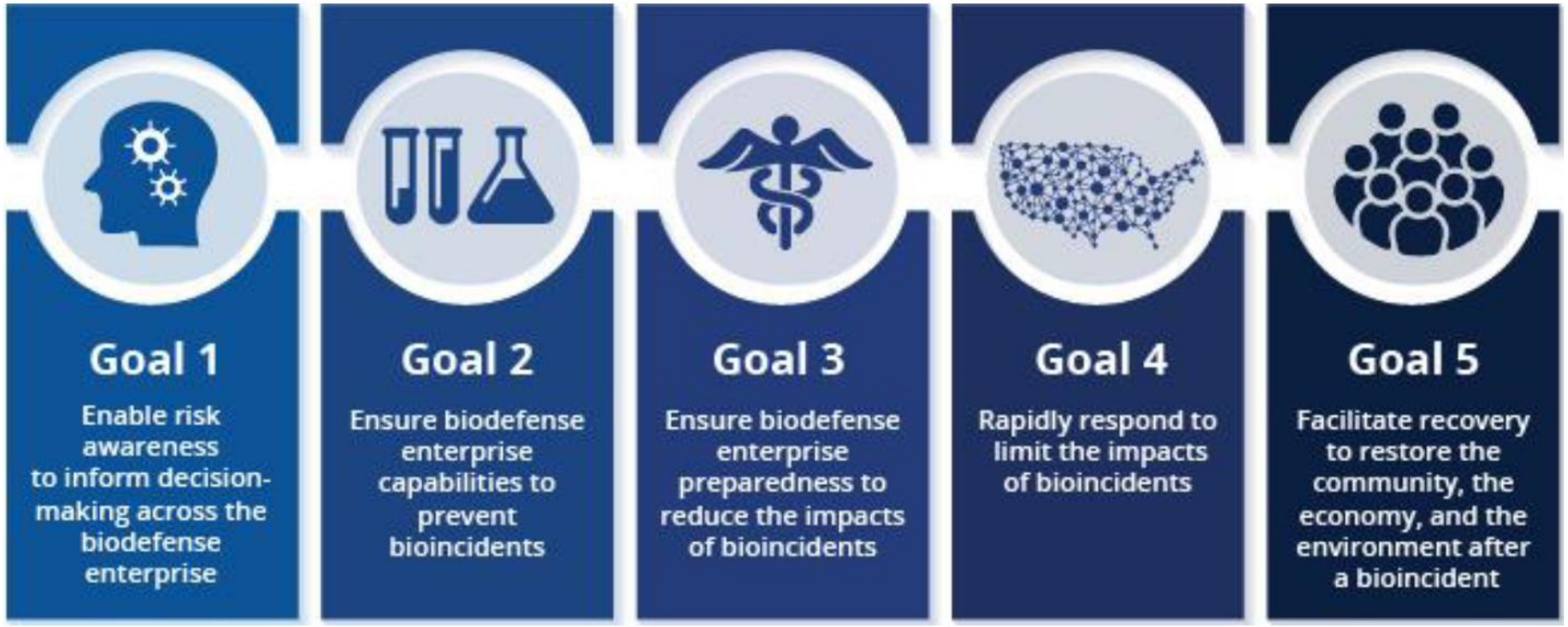
Los Angeles Times LOG IN

Op-Ed: Ebola lapses show lab safety protocols should factor in human error



"All of Community" Approach to Biodefense

A single coordinated effort to orchestrate the full range of activities that needs to be carried out to address biological incidents, whether deliberate, naturally occurring, or accidental in origin.



US National Biodefense Strategy calls for a Robust Decontamination Capability

Coordination Cooperation Collaboration

Prepare (NBS Goal 3)

- Conduct research to understand the persistence and potential for secondary transmission of biological contaminants in a variety of environments and the ability of various disinfection technologies to inactivate or remove biological contaminants.
- Develop and verify technologies for all phases of environmental cleanup that address various types of infrastructure, equipment, and environments.
- Develop readily available and scalable technologies and software tools to support water and wastewater infrastructure decontamination and the treatment of contaminated water.
- Develop and verify plans for all phases of environmental cleanup for facilities, equipment, and the environment through drills and exercises that incorporate relevant partners and stakeholders.
- Establish pre-incident decontamination and waste management recommendations for:
  - o Impacted community members, patients, and response personnel;
  - o Contaminated drinking water;
  - o Waste collection, handling, and packaging methods suitable for waste transport (including interstate transport), temporary storage, off-site treatment, and disposal;
  - o Handling and disposition of human remains;
  - o Disposition of animal remains; and
  - o Environmental decontamination practices, as warranted.

DECON

Capability and Capacity

Respond (NBS Goal 4)

- Conduct decontamination operations and the management of waste and contaminated materials in a manner that is protective of human, animal, and plant health, the environment, and the economy

Recover (NBS Goal 5)

- Address the loss of critical infrastructure capability and capacity as quickly as possible to limit cascading effects by working with owners and operators, SLTT entities, and international partners, as appropriate.
- Support restoration of critical infrastructure in addition to continued performance of National Essential Functions through recovery of the federal, military, local first responders, and other critical workforces.

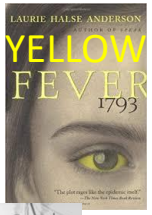
Basic Phases of Response and Recovery to a Biological Incident

Response and Recovery*					
Crisis Management		**Consequence Management**			
Notification	**First Response**	**Remediation/Cleanup**			**Restoration/ Reoccupancy**
		Characterization	**Decontamination**	**Clearance**	
Receive information on biological incident Identification of suspect release sites Notification of appropriate agencies	Initial threat assessment HAZMAT and emergency actions Forensic investigation Public health actions Screening sampling Determination of agent type, concentration, and viability Risk communication	Characterization of biological agent Characterization of affected site Site containment Continue risk communication Characterization environmental sampling and analysis Initial risk assessment Clearance goals	Decontamination strategy Remediation Action Plan Worker health and safety Site preparation Source reduction Waste disposal Decontamination of sites or items Decontamination verification	Clearance environmental sampling and analysis Clearance decision	Renovation Reoccupation decision Long-term environmental and public health monitoring
* The optimization decision process is applicable to any phase					

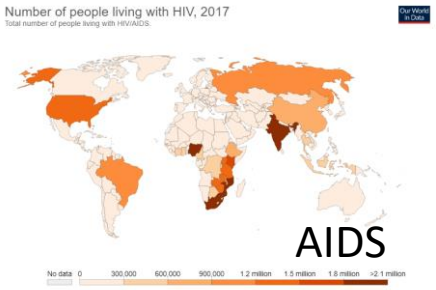

SENATOR DASCHLE
509 HART SENATE OFFICE
BUILDING
TOM BROKAW
NBC TV
09-11-01
CAN NOT STOP US.
HAVE THIS ANTHRAX
DIE NOW.
ARE YOU AFRAID?
DEATH TO AMERICA.
09-11-01
THIS IS NEXT
TAKE PENACILIN NOW
DEATH TO AMERICA
DEATH TO ISRAEL
ALLAH IS GREAT

“Responding and Recovering” from Outbreaks

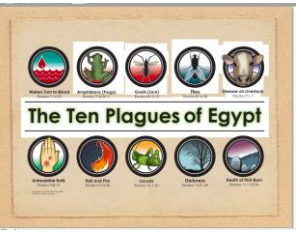
SMALLPOX

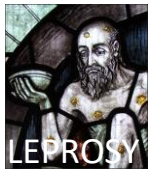


TYPHOID



MEASLES



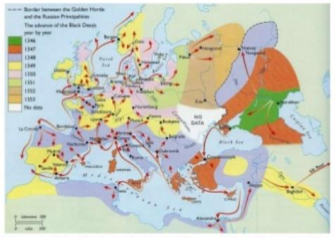


LEPROSY

CHOLERA

Antiquity | Middle Ages | Modern Era | Today | What’s Next?

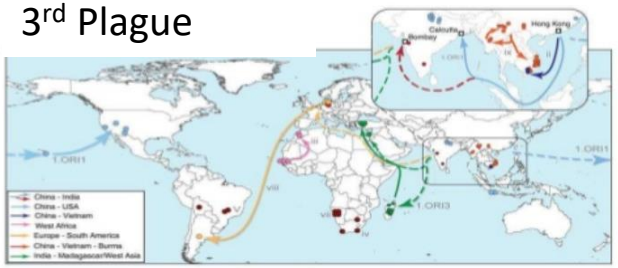
Justian

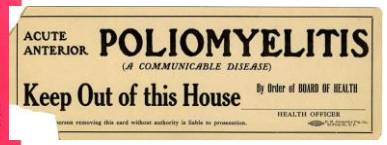


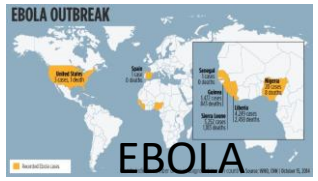
Black Death

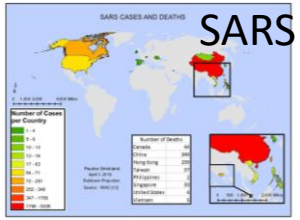
3rd Plague

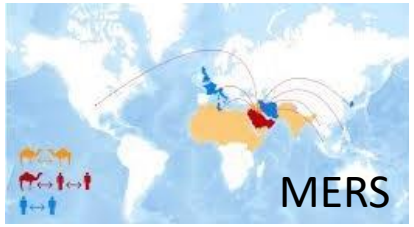
PLAGUE









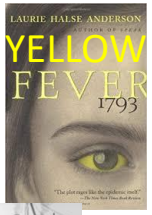


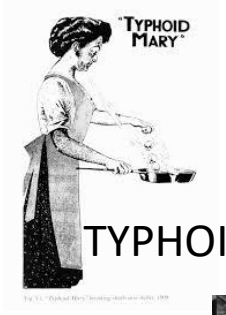
How and why do disease outbreaks occur?

- People on the move
- Living closer together
- Changing the land
- Animal relationships
- Infrastructure Failure
- Lab Accidents
- Bioterrorism

“Responding and Recovering” from Outbreaks

SMALLPOX





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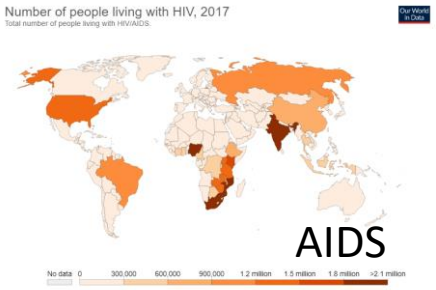

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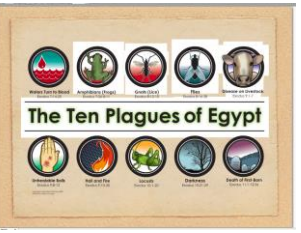

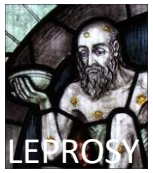

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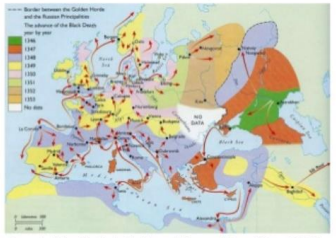

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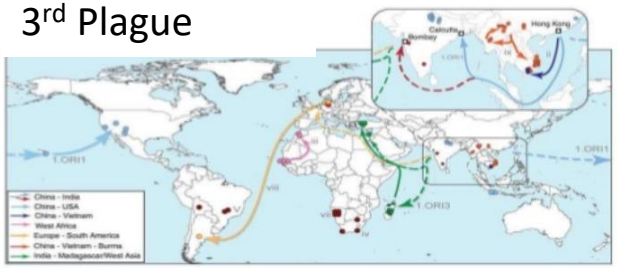
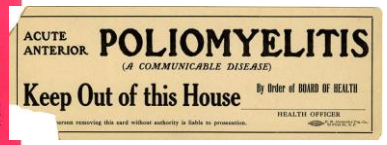
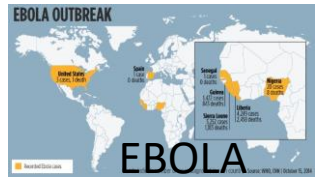
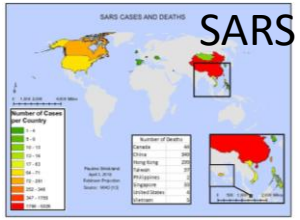
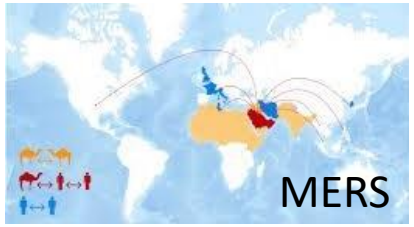




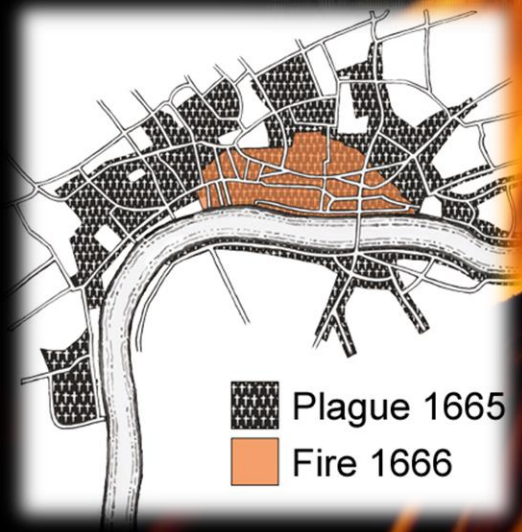






https://ridiculousgreetingcards.wordpress.com/2010/01/07/clean-world/

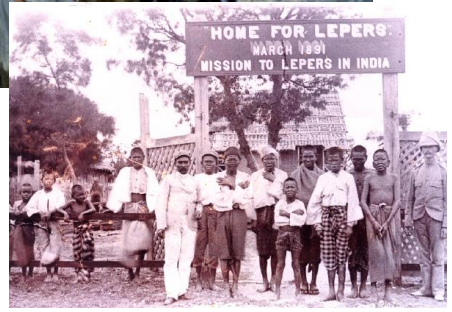
Great Fire of London, 1666



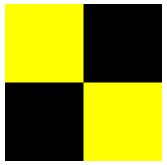
Burning FMDV carcasses (Wales, 2001)

Plague-infested homes (China, 1890s)

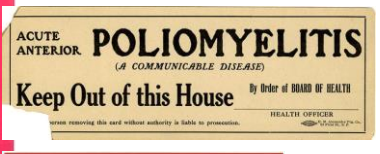
Plague-infested homes (Honolulu, 1900)


HOME FOR LEPERS
MARCH 1891
MISSION TO LEPERS IN INDIA


QUARANTINE




These Premises are
QUARANTINED
SCARLET FEVER


ACUTE ANTERIOR POLIOMYELITIS
(A COMMUNICABLE DISEASE)
Keep Out of this House
By Order of BOARD OF HEALTH
HEALTH OFFICER


THESE PREMISES ARE UNDER
QUARANTINE
No one is permitted to enter or leave without permission of the Health Officer.
WHOOPING COUGH
City-County Health Department


"TYPHOID MARY"


NIGHT EXTRA
The Seattle Daily Times
CHURCHES, SCHOOLS, SHOWS CLOSED
EPIDEMIC PUTS BAN ON ALL PUBLIC ASSEMBLIES
SEATTLE TO MAKE FIGHT ON DISEASE
AMERICANS AND FRENCH SMASH FOE
U.S. TROOPS SMASH HUNS IN ARGONNE
ONLY ONE-HALF OF CITY'S QUOTA FOR LOAN SUBSCRIBED
BLAST SHATTERS DOZENS OF TOWNS IN NEW JERSEY
NEW WAGE SCALE IN SHIPYARDS TO RUN FROM AUG. 1
THE WEATHER


QUARANTINE


HORNET + 3

Integrated Vector Control Approach

Mosquito Control Measures

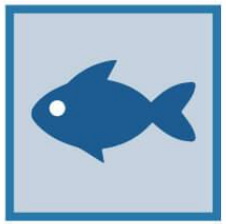
Anti-larval Measures	Anti Adult Measures	Protect Against Mosquito Bites	Legislative Control
• Environmental control • Chemical control • Biological Control	• Space Sprays • Residual Sprays • Genetic Control	• Mosquito Nets • Screening • Repellents	• Civic Laws • Regulations

INTEGRATED MOSQUITO MANAGEMENT

A comprehensive Integrated Mosquito Management program includes four steps:

1. SAMPLING
Monitor Populations

2. SOURCE REDUCTION
Remove Standing Water

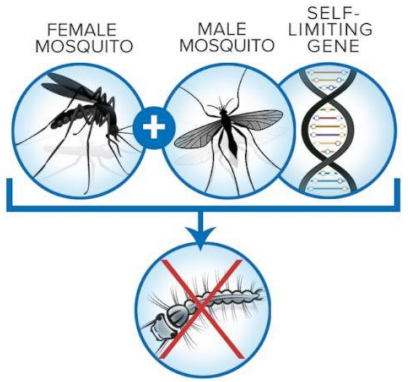


3. BIOLOGICAL CONTROL
Use Natural Mosquito Predators

4. PRODUCT APPLICATION
Use larvicides and adulticides

arpestcor

HOW OXITEC MOSQUITO BREEDING WORKS



abcNEWS

THE PLAGUE IN PENSACOLA AND ITS EXTERMINATION

The Dreaded "Bubonic Plague" Has Appeared In Pensacola

THE FEDERAL, STATE AND CITY HEALTH AUTHORITIES ARE FIGHTING THIS DISEASE FOR YOUR BENEFIT

To Insure Success, Your Co-operation Is Imperative

This Plague is primarily a disease of the Rat.
The infection is transmitted by the Flea.
The Flea living on the infected Rat becomes infected
If the infected Flea bites a human being, that person becomes infected with the Plague.
It is incumbent upon all to wage a relentless war on the Rat.

YOUR DUTY:

Trap Rats!
Obey the Sanitary Laws of the City!
Have your Premises Inspected!

CITIZENS' HEALTH COMMITTEE

A TALE OF TWO CITIES

AND HOW THEY DEALT WITH THE PLAGUE

APRIL 6, 1900
PRICE: 5¢
VOL. 6

PLAGUE HITS SAN FRANCISCO

POLITICS.
ECONOMICS.
RACISM

Merle Rosenzweig, Anna Cupito, Elise Wescom, Chase Masters

1. On the wharves, San Francisco, 1900.

2. Joseph James Kinyoun MD: Central to the discovery of the San Francisco plague of 1900-1904

3. Plague Commissioners. Photograph taken during commmissioner "bureau" meeting on February 4th, 1901. From left: Lewellys Barker, Simon Flexner, Frederick Novy.

4. Frederick Novy: Showed plague was present by performing fluid aspirated from the spleen of the deceased patient, Wong Chi Lin.
5. Page from Novy's laboratory notebook.

6. Receiving Station set up as part of the War on Rats led by the U.S. Public Health Service.
7. Rat Dissection.

8. Hiding the Sick.

9. Fighting the Plague in San Francisco.

11. San Francisco's Chinatown with barbed wire fences circa 1900.

10. San Francisco Quarantine. May 30, 1900.

12. Official Report Upon the Plague in San Francisco. the Pacific commercial advertiser, April 17, 1901.

13. The San Francisco Call. May 29th, 1900.

LIBRARY

NEW ORLEANS, 1914

How and why do disease outbreaks occur?

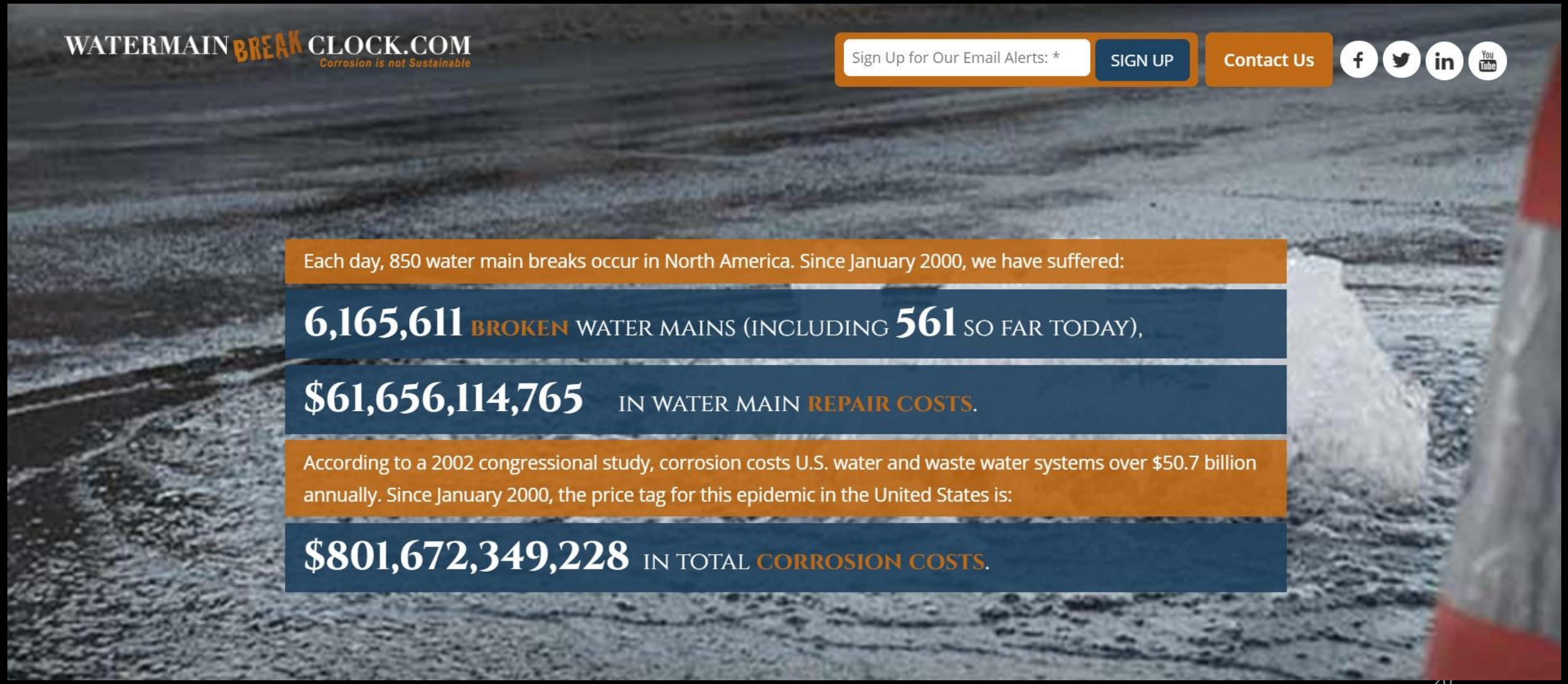
- People on the move
- Living closer together
- Changing the land
- Animal relationships
- Infrastructure Failure
- Lab Accidents
- Bioterrorism

Figure 4: Sites around the World that Received Viable *Bacillus anthracis* (anthrax) Samples from 2004 through 2015 Thought to be Inactivated from the Department of Defense's Dugway Proving Ground

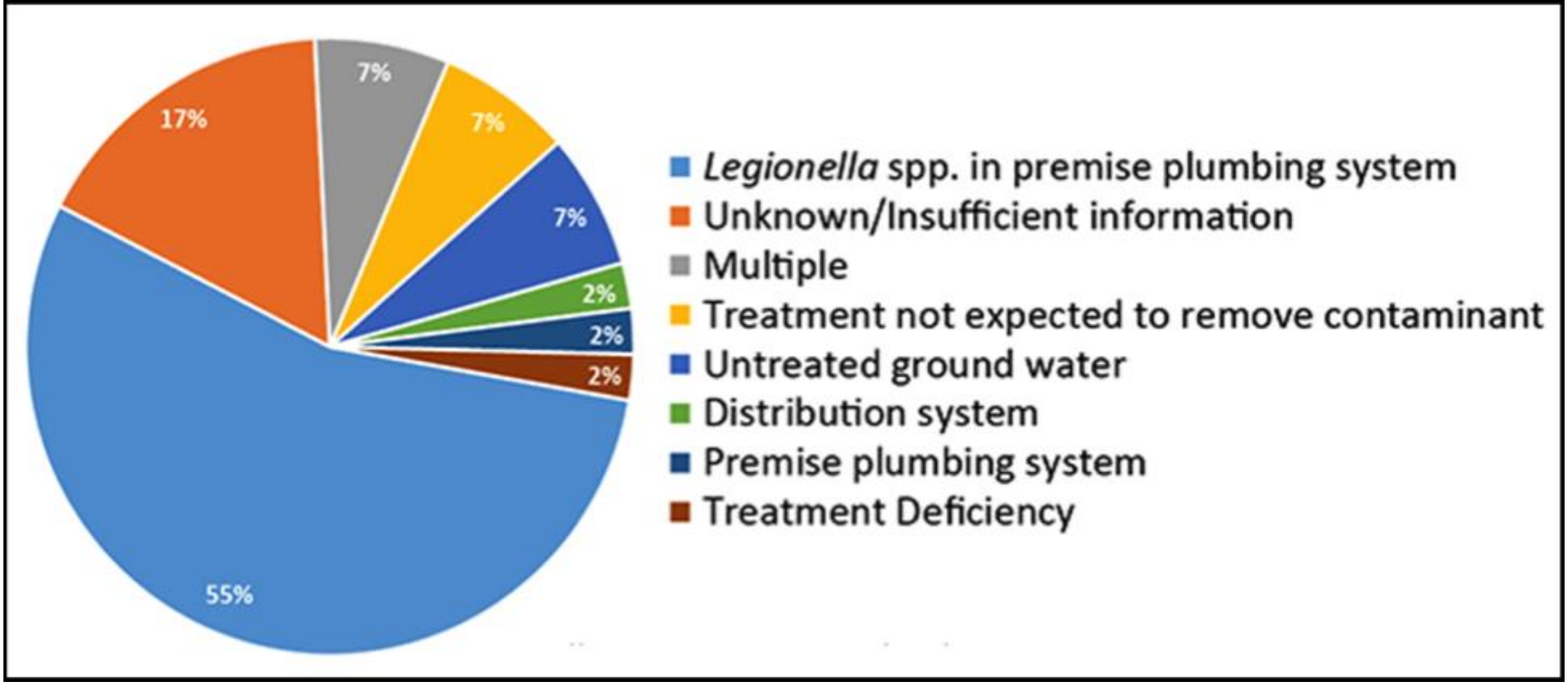
Source: GAO analysis of information from the Department of Defense and Centers for Disease Control and Prevention. | GAO-16-642

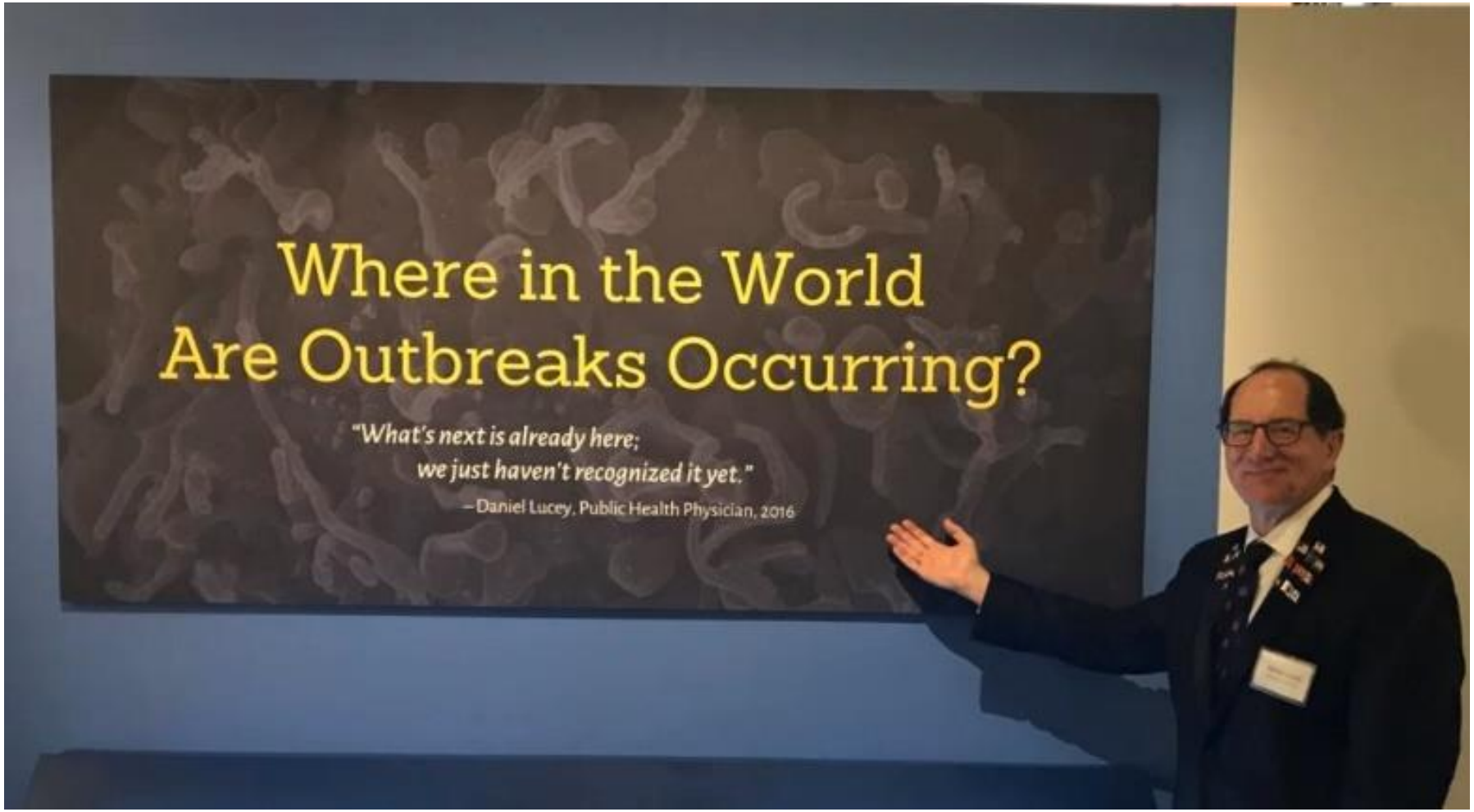
Infrastructure Failures

Screenshot: Nov 11, 2019; 4:30pm



Deficiencies Linked to Drinking Water-Associated Outbreaks, 2013-14; CDC (2017)





US National Biodefense Strategy

ASSESS PREVENT PREPARE RESPOND RECOVER

National Biodefense Strategy Calls for a Robust Decontamination Capability

For more information:

https://www.phe.gov/Preparedness/biodefense-strategy/